

Lacassine Bayou (Subsegment 050601), Louisiana,  
Draft TMDL for Dissolved Lead

Prepared for:

Louisiana Department of Environmental Quality, Water Quality Assessment Division,  
Total Maximum Daily Load Program

Prepared by:



Tetra Tech, Inc.  
10306 Eaton Place, Suite 340  
Fairfax, VA 22030

August 2010

## CONTENTS

EXECUTIVE SUMMARY .....	iii
1. Introduction .....	1
2. Study Area Description .....	3
2.1 Mermentau River Basin—Lacassine Bayou .....	3
2.2 Water Quality Data .....	5
2.3 Water Quality Standards and Criteria .....	5
2.4 Flow .....	6
2.5 Identification of Sources .....	6
3. TMDL Load Calculations .....	9
3.1 Load Determination for Lacassine Bayou (050601) .....	10
3.2 Wasteload Allocation (WLA) .....	11
3.3 Seasonal Variability .....	13
3.4 Margin of Safety (MOS) .....	13
3.5 Load Allocation (LA) .....	13
4. Monitoring Plan .....	14
5. Public Participation .....	14
6. References .....	15
Appendix A. Hardness, TSS, and Lead Monitoring Data .....	17

## Tables

Table 2-1. Subsegment 050601 land use (NLCD 2001) .....	3
Table 2-2. Summary of LPDES permits in subsegment 050601 .....	8
Table 3-1. WLA summary for subsegment 050601 .....	11
Table A-1. Hardness and total suspended solids data for station 98 .....	17
Table A-2. Hardness summary statistics .....	22
Table A-3. Dissolved lead data for station 98 .....	22
Table A-4. Dissolved lead summary statistics .....	26

## Figures

Figure 1-1. Subsegment 050601 (Lacassine Bayou) location and monitoring. ....	2
Figure 2-1. Land use in subsegment 050601 (Lacassine Bayou). ....	4
Figure 2-2. Dissolved lead data at station 98. ....	5
Figure 2-3. Permit locations in subsegment 050601 (Lacassine Bayou). ....	7

## EXECUTIVE SUMMARY

Section 303(d) of the Clean Water Act and the U.S. Environmental Protection Agency's Water Quality Planning and Management Regulations (Title 40 of the *Code of Federal Regulations* Part 130) require states to identify waterbodies that are not meeting water quality standards and to develop total maximum daily loads (TMDLs) of pollutants for those waterbodies. A TMDL establishes the amount of a pollutant that a waterbody can assimilate without exceeding its water quality standard for that pollutant. TMDLs provide the scientific basis for a state to establish water quality-based controls to reduce pollution from both point and nonpoint sources in order to restore and maintain the quality of the state's water resources (USEPA 1991).

A TMDL for a given pollutant and waterbody is composed of the sum of individual wasteload allocations (WLAs) for point sources and load allocations (LAs) for nonpoint sources and natural background levels. In addition, the TMDL must include an implicit or explicit margin of safety (MOS) to account for the uncertainty in the relationship between pollutant loads and the quality of the receiving waterbody. The TMDL components are illustrated using the following equation:

$$TMDL = \sum WLAs + \sum LAs + MOS.$$

This dissolved lead TMDL has been developed for Lacassine Bayou, in the Mermentau River Basin in southwestern Louisiana. Lacassine Bayou flows for 25 miles from its headwaters to Grand Lake.

For the purpose of TMDL development, the dissolved lead numerical criterion was calculated using the freshwater chronic value for aquatic life protection using the average hardness values from 2003-2007 at station 98 (Bayou Lacassine near Lake Arthur, Louisiana). The dissolved lead numerical criterion for Lacassine Bayou was determined to be 1.04 micrograms per liter. For the purpose of this TMDL, dissolved lead was considered to be a conservative parameter. Using the 7Q10 flow at the end of subsegment 050601 and the calculated lead criterion, a TMDL of 0.830 pound per day was calculated. The TMDL was then allocated to its WLA, MOS, and LA components.

## 1. Introduction

Section 303(d) of the Clean Water Act and the U.S. Environmental Protection Agency's (EPA's) Water Quality Planning and Management Regulations (Title 40 of the *Code of Federal Regulations* [CFR] Part 130) require states to develop total maximum daily loads (TMDLs) of pollutants for waterbodies that are not supporting their designated uses, even if pollutant sources have implemented technology-based controls. A TMDL establishes the maximum allowable load (mass per unit of time) of a pollutant that a waterbody is able to assimilate and still support its designated uses. The maximum allowable load is determined on the basis of the relationship between pollutant sources and in-stream water quality. A TMDL provides the scientific basis for a state to establish water quality-based controls to reduce pollution from both point and nonpoint sources in order to restore and maintain the quality of the state's water resources (USEPA 1991).

A TMDL for a given pollutant and waterbody is composed of the sum of individual wasteload allocations (WLAs) for point sources and load allocations (LAs) for nonpoint sources and natural background levels. In addition, the TMDL must include an implicit or explicit margin of safety (MOS) to account for the uncertainty in the relationship between pollutant loads and the quality of the receiving waterbody. The TMDL components are illustrated in the following equation:

$$TMDL = \sum WLAs + \sum LAs + MOS.$$

This dissolved lead TMDL has been developed for Lacassine Bayou, in the Mermentau River Basin in southwestern Louisiana. Lacassine Bayou flows for 25 miles from its headwaters to Grand Lake. (Figure 1-1).

The Louisiana Department of Environmental Quality (LDEQ) placed Lacassine Bayou on the state's 1996 303(d) list and identified it as partially supporting its designated use of primary contact recreation and not supporting the designated use of fish and wildlife propagation because of nutrients, organic enrichment/low dissolved oxygen, pathogen indicators, suspended solids, and turbidity. The suspected sources were minor industrial point sources, minor municipal point sources, domestic wastewater lagoon, agriculture, irrigated crop production, pastureland, urban runoff/storm sewers, and channelization (LDEQ 1996). LDEQ placed Lacassine Bayou on the state's 303(d) list in 1998 and identified it as not supporting its designated use of fish and wildlife propagation because of nutrients (phosphorus and nitrogen), organic enrichment/low dissolved oxygen, suspended solids, turbidity, and metals (lead). The suspected sources were agriculture (non-irrigated crop production and irrigated crop production), urban runoff and storm sewers, and unknown sources (LDEQ 1998). LDEQ placed Lacassine Bayou on the state's 303(d) list in 2000 and 2002 and identified it as not supporting its designated use of fish and wildlife propagation because of organic enrichment/low dissolved oxygen. The suspected sources were agriculture, natural sources, and municipal point sources (LDEQ 2001, 2003). LDEQ placed Lacassine Bayou in the state's *Louisiana Water Quality Inventory: Integrated Report (Integrated Report)* in 2004 and 2006 and identified it as not supporting its designated use of fish and wildlife propagation because of low dissolved oxygen from irrigated crop production, managed pasture grazing, and natural conditions—Water Quality Standards Use Attainability Analyses Needed (LDEQ 2005, 2007a). In the state's 2006 *Integrated Report*, LDEQ includes mercury as a cause of not supporting the fish and wildlife designated use. The suspected cause was atmospheric deposition—toxics and unknown sources (LDEQ 2007a). In the state's draft 2008 *Integrated Report*, LDEQ lists Lacassine Bayou's low dissolved oxygen and mercury as causes of impairment and added lead. The suspected source of impairment from lead is unknown (LDEQ 2008).

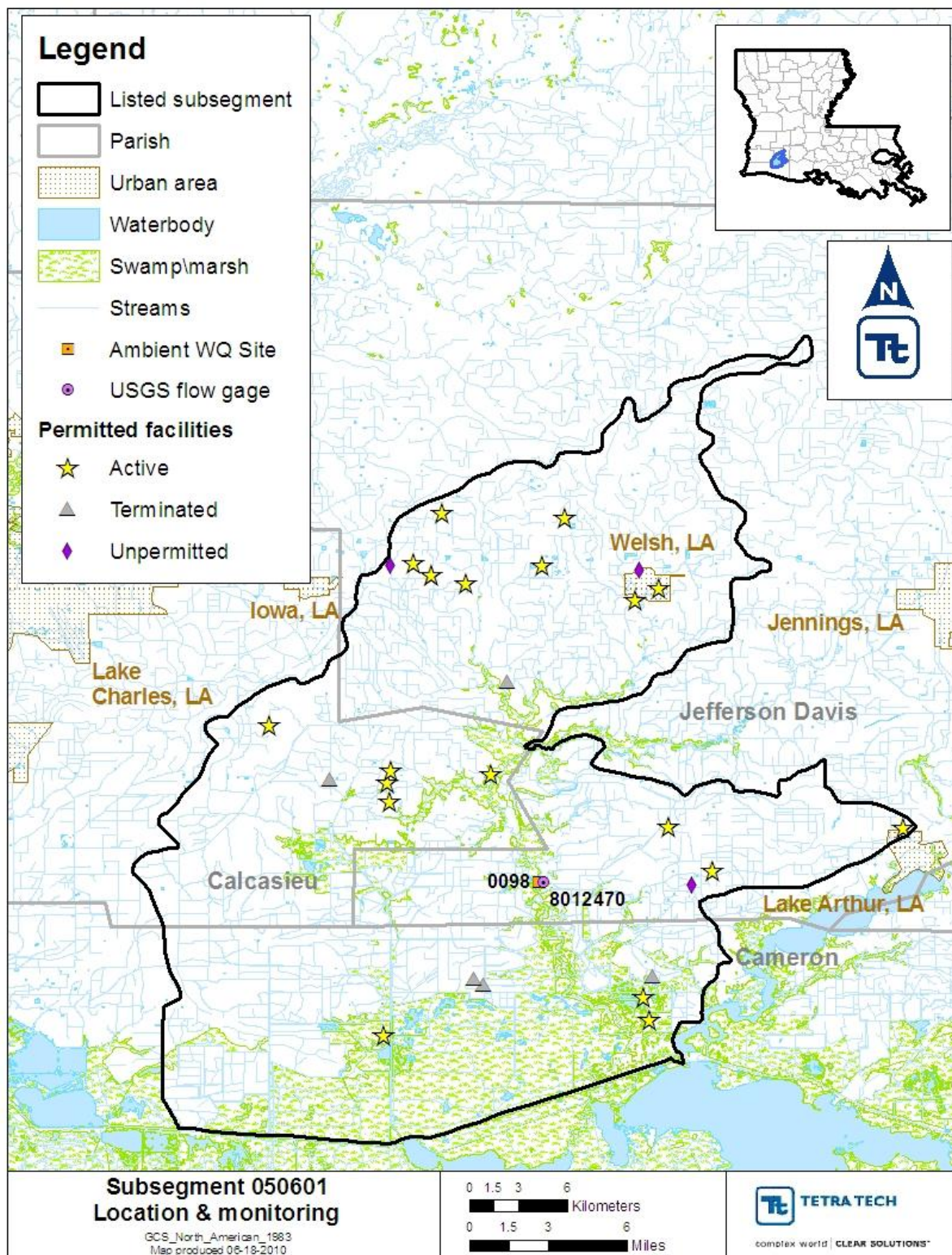


Figure 1-1. Subsegment 050601 (Lacassine Bayou) location and monitoring.

## 2. Study Area Description

### 2.1 Mermentau River Basin—Lacassine Bayou

This dissolved lead TMDL has been developed for Lacassine Bayou, in the Mermentau River Basin in southwestern Louisiana. Lacassine Bayou flows for 25 miles from the headwaters to Grand Lake. (Figure 1-1). The Bayou Lacassine watershed is 398 square miles and is in the southwestern portion of the Mermentau River Basin. Bayou Lacassine includes two subsegments, 050601 and 050603. Subsegment 050601 includes Lacassine Bayou from its headwaters to Grand Lake (LDEQ 2009a).

The region is sparsely populated and characterized mainly by agriculture. The Bayou Lacassine watershed has the following tributaries: East and West Bayou Lacassine, Bayou Chene, Thornwell Drainage Canal and several unnamed tributaries. The area is sparsely populated outside those small rural communities. The only two wastewater treatment systems included in the modeling effort for the TMDL are Welsh and Jennings (LDEQ 2009a).

The main agricultural crops in the watershed are rice, soybeans, pasture and sugarcane. A seasonal peak exists in the concentration of nutrients in the bayous (nitrates and nitrites, total Kjeldahl nitrogen, and total phosphorous) that coincides with the spring discharge of muddy water from the rice fields. That association is supported by more than two decades of water quality data collected by LDEQ. Cumulative evidence exists that a large proportion of the loading in the watershed is exerted in a concentrated region in the upper mainstem of Bayou Lacassine and around the confluence of East and West Bayou Lacassine. That area is dominated by rotational rice/soybean production. Implementing best management practices, such as precision leveling and dry field planting should eliminate the spring rice discharges and bring the watershed into compliance with the TMDLs for dissolved oxygen. Bayou Lacassine has had exceedences of the pesticides Carbofuran and Fipronil. The use of Carbofuran is now strictly limited (LDEQ 2009a).

Land use data from the 2001 National Land Cover Database (NLCD) were used, as shown in Table 2-1 and Figure 2-1. NLCD 2001 is a land-cover database composed of land cover, impervious surface, and canopy density data. NLCD 2001 uses improved classification algorithms, which result in data with more precise rendering of spatial boundaries between the 16 classes than those obtained using NLCD 1992 (USEPA 2007).

**Table 2-1. Subsegment 050601 land use (NLCD 2001)**

Land use	Percent
Open water	1.46%
Developed	5.36%
Barren land	0.02%
Forest	0.09%
Grass/shrub	1.68%
Pasture/hay	14.08%
Cultivated crops	53.19%
Woody wetlands	6.31%
Emergent herbaceous wetlands	17.82%

Source: USEPA 2007



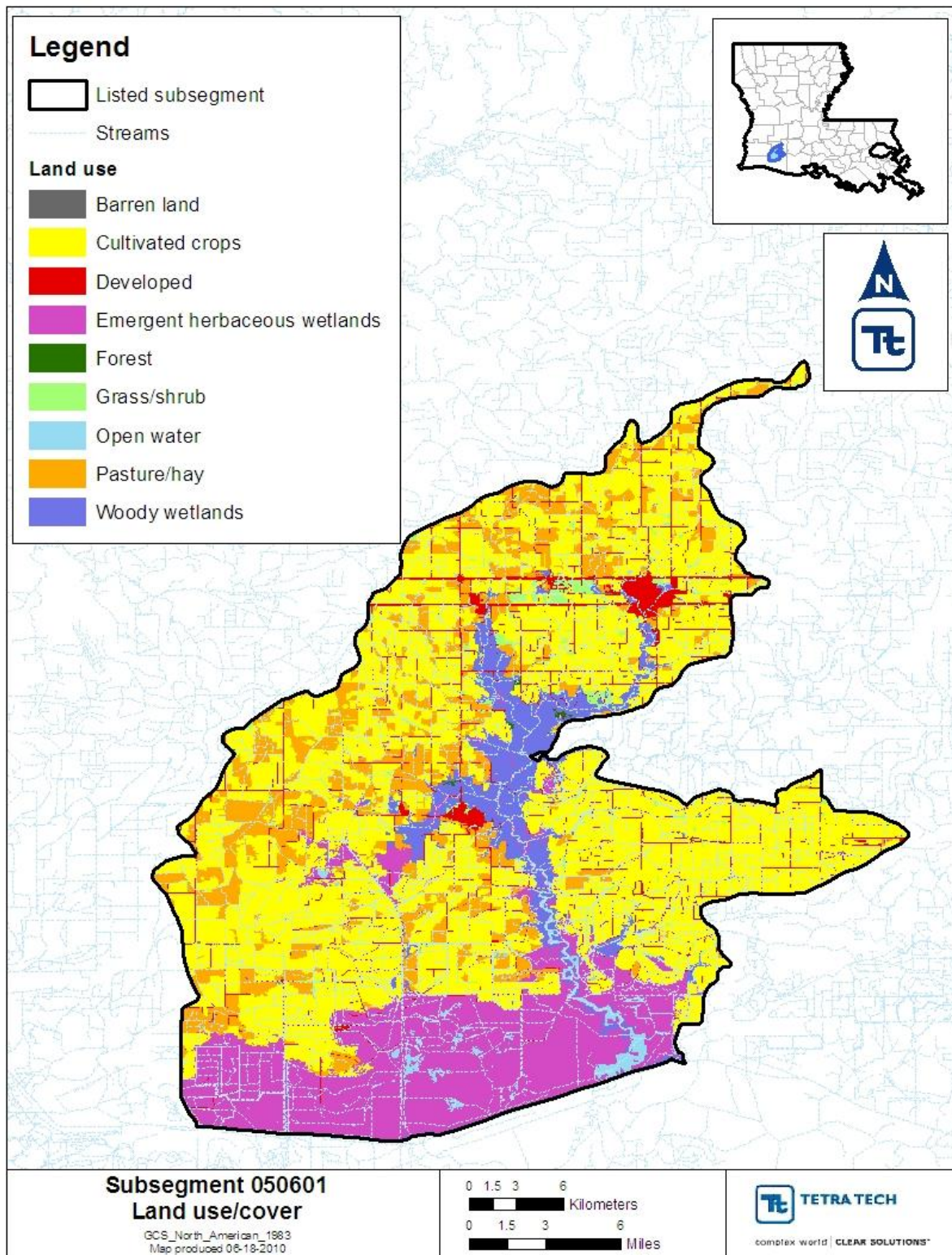


Figure 2-1. Land use in subsegment 050601 (Lacassine Bayou).

## 2.2 Water Quality Data

One water quality station is on Lacassine Bayou with lead data collected since 2003. Station 98 (Bayou Lacassine near Lake Arthur, Louisiana) has had eight dissolved lead observations collected since 2003. Appendix A contains the raw water quality data.

The lead data from station 98 containing recent data were plotted over time for subsegment 050601 (Figure 2-2). No distinct seasonal trends or patterns can be seen in the water quality data.

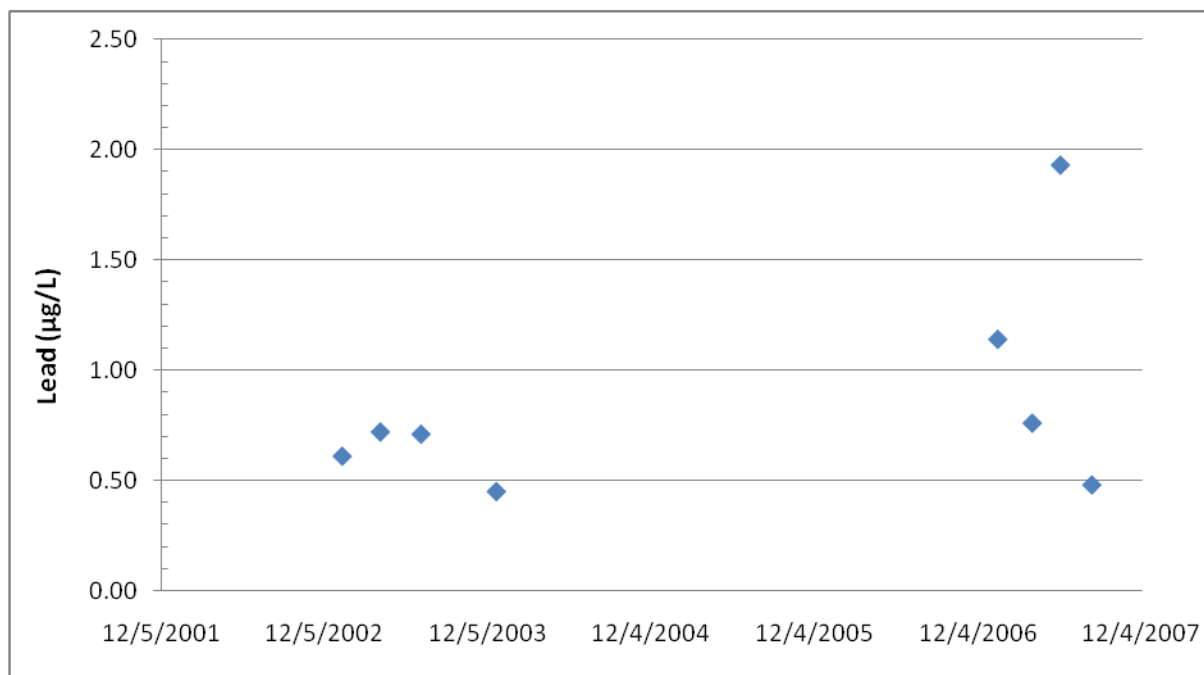


Figure 2-2. Dissolved lead data at station 98.

## 2.3 Water Quality Standards and Criteria

The designated uses for subsegment 050601 include primary and secondary contact recreation, propagation of fish and wildlife, and agriculture. Primary contact recreation consists of any recreational or other water contact activity involving prolonged or regular full-body contact with the water and in which the probability of ingesting appreciable amounts of water is considerable. Examples of that type of water use are swimming, water skiing, and diving (LDEQ 2007b). Secondary contact recreation consists of any recreational or other water contact activity in which prolonged or regular full-body contact with the water is either incidental or accidental, and the probability of ingesting appreciable amounts of water is minimal. Examples of that type of water use are fishing, wading, and boating (LDEQ 2007b). The criteria for protection of aquatic life are based on acute and chronic concentrations in fresh and marine waters and are developed primarily for attainment of the fish and wildlife propagation use.

The aquatic life criterion was used for this TMDL along with the 7Q10 flow for the waterbody. Metals criteria are based on hardness concentrations in ambient waters. The criterion was calculated using the freshwater chronic criteria equation (LDEQ 2009b):

$$\text{Criterion} = e^{((1.2730 \times (\ln(\text{hardness}))) - 4.7050)} \times (1.46203 - (0.145712 \times \ln(\text{hardness})))$$

Hardness concentrations from the past 5 years at station 98 were averaged and used in calculating the lead criteria. The average hardness concentration for the subsegment 050601 is 44.81 milligrams per



liter (mg/L). The applicable chronic lead criterion, therefore, is 1.04 µg/L. The criterion applies at all times. The available dissolved lead data and the sample exceedances are shown in Appendix A.

The Louisiana water quality standards also include an antidegradation policy (*Louisiana Administrative Code* Title 33, Part IX, Section 1109.A), which states that state waters exhibiting high water quality should be maintained at that high level of water quality. If that is not possible, water quality of a level that supports the designated uses of the waterbody should be maintained. The designated uses of a waterbody may be changed to allow a lower level of water quality only through a use attainability study. LDEQ has developed this TMDL to be consistent with the state's antidegradation policy (LDEQ 2000).

## **2.4 Flow**

One active U.S. Geological Survey (USGS) flow monitoring gage, 08012470 (Bayou Lacassine near Lake Arthur, Louisiana), is on subsegment 050601. The flows at the USGS gage flow in both directions because of such factors as wind, tides, and irrigation pumping.

## **2.5 Identification of Sources**

Louisiana's draft 2008 *Integrated Report* lists Lacassine Bayou as not supporting its designated use of fish and wildlife propagation because of lead from unknown sources (LDEQ 2008). LDEQ has established a group of reference streams throughout the state that exhibit near-pristine characteristics and have no man-made sources discharging or contributing runoff into them. Two of the reference streams in the Calcasieu Basin—Six Mile Creek and Beckwith Creek—were found as not supporting the lead criteria during the 2000 305(b) assessment. Therefore, LDEQ concluded that natural background loading is the dominant source of lead in other waterbodies in the state (LDEQ 2004).

Information on point source dischargers in the subsegment was obtained from LDEQ files. According to the LDEQ discharger database, 22 point sources are currently discharging into subsegment 050601 and 5 permits have previously been terminated (Figure 2-3 and Table 2-2).

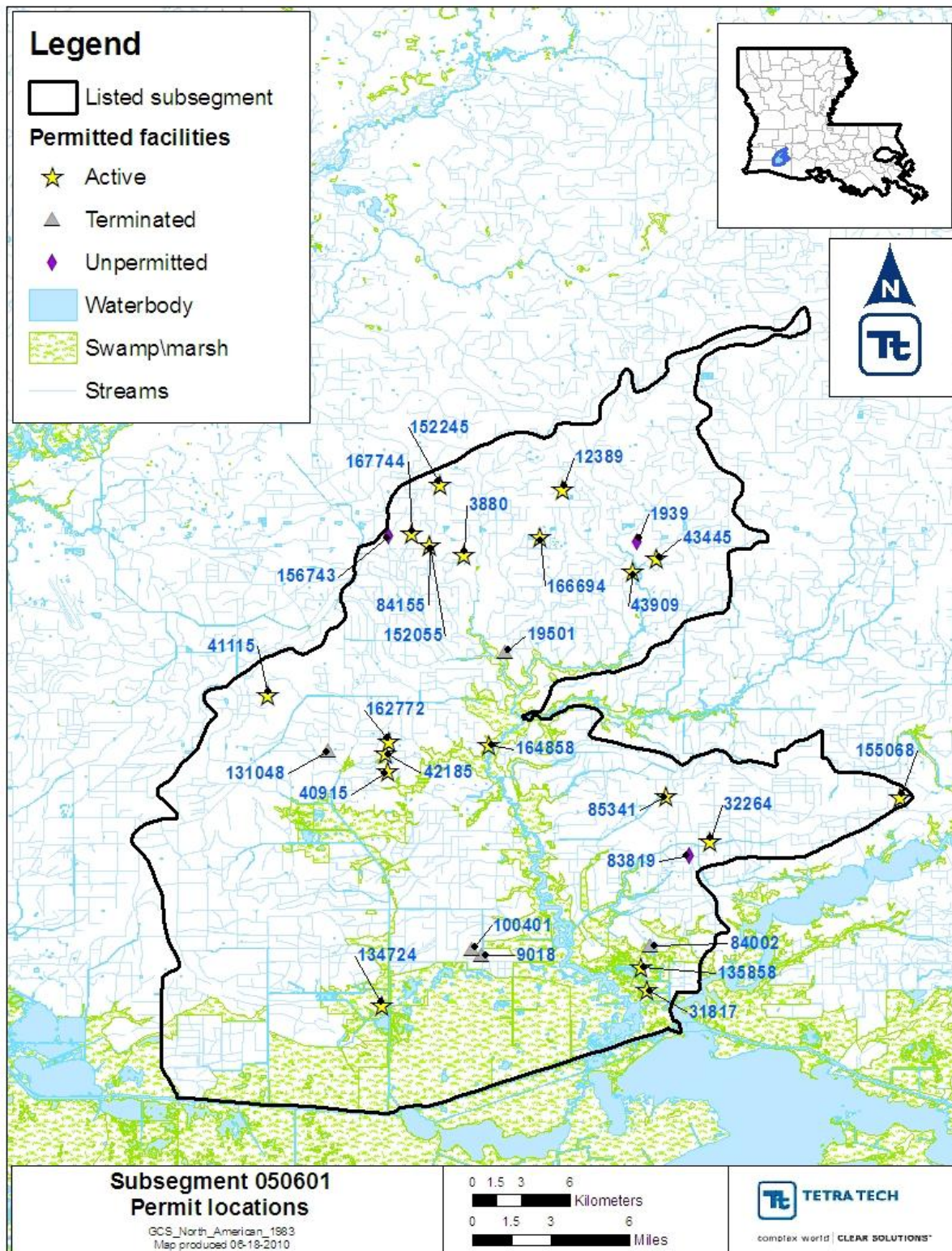


Figure 2-3. Permit locations in subsegment 050601 (Lacassine Bayou).

**Table 2-2. Summary of LPDES permits in subsegment 050601**

AI #	Permit #	Outfall	Facility name	Exp. date	Facility type	Outfall type	Receiving waterbody
43909	LA0020591	001	Welsh, Town of - WWTP	05/01/12	Municipal Agency	treated sanitary wastewater	Effluent pipe to East Bayou Lacassine to Mermentau River
41115	LA0105970	001/002	ConocoPhillips Pipeline Co - Manchester Station - LA Gathering System	09/21/14	Wholesale Trade-non-durable Goods	intermittent discharge of stormwater runoff from the main containment area	Effluent pipe – ditch - Indian Bayou Canal
85341	LA0115592	001	Jefferson Davis Parish - Water & Sewer Commission #1	04/01/13	Services, not elsewhere classified	iron and manganese filter and softener backwash wastewater and previously treated sanitary wastewater (101)	Thornwell Drainage canal via local drainage to Bayou Lacassine from an existing potable water treatment plant
		101				treated sanitary wastewater	via outfall 001 to Thornwell Drainage canal via local drainage to Bayou Lacassine
167744	LA0124974	001	Zagis USA - Zagis USA LLC	Pending	Textile Mill Products	minor industrial wastewater	Unnamed tributary to West Bayou Lacassine
134724	LAG33A299	001	Chalkley-Garrison Production Facility - Sweet Lake Field	09/27/10	Oil and Gas Extraction	dewatering effluent	canal to Bell City Drainage Canal to Little Lake Misere
		002				deck drainage	
		003				formation test fluids	
		005				domestic wastewater	
		006				hydrostatic test water	
		007				misc. discharges	
		04A				treated sanitary wastewater	
		04B				treated sanitary wastewater	
31817	LAG33A421	001	Lakeside Field Production Facility	09/27/10	Oil and Gas Extraction	dewatering effluent	Effluent pipe to a canal to Bayou Lacassine to Mud Lake
		002				deck drainage	
		003				formation test fluids	
		005				domestic wastewater	
		006				hydrostatic test water	
		007				misc. discharges	
		04A				treated sanitary wastewater	
		04B				treated sanitary wastewater	
135858	LAG33A432	001	Walker #9 Facility	09/27/10	Oil and Gas Extraction	dewatering effluent	Effluent pipe to a canal to Bayou Lacassine to Mud Lake
		002				deck drainage	
		003				formation test fluids	
		005				domestic wastewater	
		006				hydrostatic test water	
		007				misc. discharges	
		04A				treated sanitary wastewater	
		04B				treated sanitary wastewater	
164858	LAG533156	001	Calcasieu Parish Police Jury - Lorraine Park	11/08/12	Nonclassifiable Establishments	treated sanitary wastewater	at the point of discharge from the sewage treatment plant, discharge pipe to Lorraine Road ditch
155068	LAG533402	001	Brandt A National Oilwell Varco LP Co - Lake Arthur Facility		Oil and Gas Extraction	treated sanitary wastewater	Canal to Keystone Ditch
40915	LAG540206	001	Bell City High School	06/05/13	Educational Services	treated sanitary wastewater	at the point of discharge from the sewage treatment plant
3880	LAG540398	001	Lacassine Elementary High School	07/01/13	Educational Services	treated sanitary wastewater	Unnamed ditch to Highway 90 ditch to West Bayou

AI #	Permit #	Outfall	Facility name	Exp. date	Facility type	Outfall type	Receiving waterbody
							Lacassine to Bayou Lacassine
42185	LAG540446	001	Broussard Middle School	07/01/13	Educational Services	treated sanitary wastewater	ditch Cypress Bayou - Bayou Tortue
43445	LAG750244	001	C&A Holdings LLC	03/15/14	General Agency Interest	exterior vehicle and equipment wash wastewater	Unnamed ditch to unnamed coulee to East Bayou Lacassine to Mud Lake
12389	LAR05N014	001	Jefferson Davis Parish Sanitary Landfill Commission	05/30/10	Parish Agency	MSGP - stormwater	Unnamed gully to Bayou Lacassine
		002				MSGP - stormwater	
		003				MSGP - stormwater	
		004				MSGP - stormwater	
		005				treated sanitary wastewater	
		006				MSGP - stormwater	
155068	LAR05N390		Brandt A National Oilwell Varco LP Co - Lake Arthur Facility		Oil and Gas Extraction	MSGP - stormwater	Canal to Keystone Ditch
162772	LAR05P074		Sweet Lake Land & Oil Co C-9 - Bell City East Field	02/27/14	Oil and Gas Extraction	MSGP - stormwater	Unnamed drainage ditch, then Indian Bayou Canal, then Bayou Lacassine
166694	LAR05P223		Welsh Central Facility # 2 - Wagner Oil Co		Nonclassifiable Establishments	MSGP - stormwater	Unnamed open body of water
84155	LAR10B198	001	Lake Charles Cane - Lacassine Mill LLC - Lacassine Mill	10/01/14	Food and Kindred Products	wastewaters and stormwater	West Bayou Lacassine Lateral # 5 to West Bayou Lacassine
		002				stormwater	
		003				stormwater	
152245	LAR10E296	001	MBO LLC - Lacassine Oilfield Service	10/01/14	Nonclassifiable Establishments	stormwater	Unnamed feature to West Bayou Lacassine
152055	LAR10F052	001/003/004	Louisiana Green Fuels LLC - Lacassine Ethanol Plant	10/01/14	Chemicals and Allied Products	washwaters, non-contact cooling, stormwater, Internal 10A/10B	West Bayou Lacassine Lateral # 5 to West Bayou Lacassine
		002				non-process stormwater	
156743	LAU005690		A NEW Rock Co Inc	n/a	Nonclassifiable Establishments		
1939	LAU009268		Lyons Flying Service Inc	n/a	Amusement and Recreation Services		
9018	LAR10C464		USFWS - Lacassine Wildlife Refuge	Terminated 6/23/08	Federal Agency		
100401	LAR10C509		USFWS -South Lacassine Pool Levee Construction Project	Terminated 10/14/09	Heavy Construction Other Than Bldg. Constr.		
84002	LAG33A211		South Thornwell Field Facility	Terminated 3/22/10	Oil and Gas Extraction		
131048	LAR05N693		MI SWACO - Speedwell Youngsville Facility	Terminated 12/06	Nonclassifiable Establishments		
19501	LAG540425		LADOTD - Gonzales I 10 West Bound Rest Area	Terminated 3/11/05	State Agency		

Note: n/a = not applicable. (This facility is not permitted.)

<sup>a</sup> This facility has no known or permitted wastewater discharge as of the TMDL publish date.

### 3. TMDL Load Calculations

A TMDL is the total amount of a pollutant that can be assimilated by the receiving waterbody while still achieving water quality standards. In TMDL development, allowable loadings from all pollutant



sources that cumulatively amount to no more than the TMDL must be established and thereby provide the basis for establishing water quality-based controls.

A TMDL for a given pollutant and waterbody is composed of the sum of individual WLAs for point sources, LAs for nonpoint sources and natural background levels. In addition, the TMDL must include an implicit or explicit MOS to account for the uncertainty in the relationship between pollutant loads and the quality of the receiving waterbody. The TMDL components are illustrated using the following equation:

$$TMDL = \sum WLAs + \sum LAs + MOS.$$

TMDLs are typically expressed as a mass loading (e.g., pounds per day [lbs/day]).

Both section 303(d) of the Clean Water Act and the regulations at 40 CFR 130.7 require that TMDLs include an MOS to account for uncertainty in available data or in the actual effect that controls will have on the loading reductions and receiving water quality. The MOS may be expressed explicitly as unallocated assimilative capacity or implicitly using conservative assumptions in establishing the TMDL. For a more detailed discussion of the MOS, see Section 3.4.

### **3.1 Load Determination for Lacassine Bayou (050601)**

The sampling events used as the basis for this TMDL were performed to meet the needs of the state to develop the *Integrated Report*, which includes the biennial section 305(b) report (*Water Quality Inventory*) and the section 303(d) list of impaired waters. The data are adequate for a conservative TMDL according to the assumption that no fate and transport mechanisms are present in the waterbodies. Data gathering did not include any flow measurements, any hardness measurements, nor any upstream sampling and measurements for background conditions. Without such data, fate and transport modeling and calculating reductions required from current loads are not possible.

#### **Calculating the TMDL**

Dissolved lead was treated as a conservative parameter. The following equation was used to calculate the dissolved lead TMDL, and the TMDL calculations are shown further below.

$$TMDL \text{ (lb/day)} = (\text{lead criterion [mg/L]}) \times (\text{critical flow [mgd]}) \times 8.345$$

where 8.345 is a conversion factor. Only observed data from during 2003 and after were used in this TMDL. Since this area is tidally influenced, the critical tidal flow was determined. To do this, the tidal cycle was assumed to be 24 hours and the tidal range was conservatively assumed to be 6 inches. The critical tidal flow is calculated from the tidal flow, which is the average or typical flow averaged over one tidal cycle. The tidal flow is determined by multiplying the surface area of the waterbody by the typical tidal range (the distance between high and low flow) and divided by half a tidal cycle. The tidal flow is then divided by three to obtain the critical tidal flow. For the Bayou Lacassine the surface area was assumed to be 4.1 square miles. The tidal flow was 1,331 cfs and the critical tidal flow was 433 cfs. This flow was further divided by 3, as per Louisiana regulations, to obtain the 7Q10 equivalent critical flow of 148 cfs.

$$\text{Lead criterion} = 1.04 \text{ } \mu\text{g/L} = 0.00104 \text{ mg/L}$$

$$\text{Critical flow (7Q10)} = 148 \text{ cfs} = 95.65 \text{ mgd}$$

$$TMDL = (0.00104 \text{ mg/L}) \times (95.65 \text{ mgd}) \times 8.345 = 0.830 \text{ lb/day}$$



### 3.2 Wasteload Allocation (WLA)

The WLA portion of the TMDL equation is the total loading of a pollutant that is assigned to point sources. The point sources in subsegment 050601 include sanitary and industrial wastewater and stormwater. Stormwater loading is usually based on average annual rainfall, while the TMDL is calculated at critical low (7Q10) flow. Since these two conditions are not compatible, LDEQ assumes that stormwater runoff is zero when developing a TMDL at critical low flow. All of the individual point source facilities identified in Section 2.5 are permitted to discharge to subsegment 050601. For this TMDL, which is being developed at 7Q10 flow, facility stormwater flows should be assumed to be zero.

WLAs were calculated at each outfall for all permitted point sources in subsegment 050601 (Table 3-1). The equation for WLA calculation is

$$WLA \text{ (lbs/day)} = (\text{limit [mg/L]}) \times (\text{flow [gpd]}) \times 0.000008345$$

where 0.000008345 is a conversion factor. Subsegment 050601 does not contain actively permitted facilities with lead limitations (excluding stormwater). Therefore, the WLA is zero.

**Table 3-1. WLA summary for subsegment 050601**

AI #	Permit #	Outfall	Facility name	Outfall type	Flow type	Flow (GPD)	Lead limit type	Total lead limit (µg/L)	Total lead load (lb/d)	Dis. lead limit (µg/L)	Dis. lead load (lb/d)
43909	LA0020591	001	Welsh, Town of - WWTP	treated sanitary wastewater	design	700,000	none		0		0
41115	LA0105970	001	ConocoPhillips Pipeline Co - Manchester Station - LA Gathering System	intermittent discharge of stormwater runoff from the main containment area	design	600	none		0		0
		002			design	600	none		0		0
85341	LA0115592	001	Jefferson Davis Parish - Water & Sewer Commission #1	Iron and manganese filter and softener backwash wastewater and previously treated sanitary wastewater (101)	design	56,000	none		0		0
		101		treated sanitary wastewater	design	80	none		0		0
167744	LA0124974	001	Zagis USA - Zagis USA LLC	minor industrial wastewater	DMR average	5,760	none		0		0
134724	LAG33A299	001	Chalkley-Garrison Production Facility - Sweet Lake Field	dewatering effluent	not avail.		none		0		0
		002		deck drainage	not avail.		none		0		0
		003		formation test fluids	not avail.		none		0		0
		005		domestic wastewater	not avail.		none		0		0
		006		hydrostatic test water	not avail.		daily max.	50	0	8.92	0
		007		Misc. Discharges	not avail.		none		0		0
		04A		treated sanitary wastewater	not avail.		none		0		0
		04B		treated sanitary wastewater	not avail.		none		0		0
31817	LAG33A421	001	Lakeside Field Production Facility	dewatering effluent	DMR average	0	none		0		0
		002		deck drainage	DMR	167	none		0		0

DRAFT—Lacassine Bayou (Subsegment 050601) Dissolved Lead TMDL

Origination Date: August 12, 2010

AI #	Permit #	Outfall	Facility name	Outfall type	Flow type	Flow (GPD)	Lead limit type	Total lead limit (µg/L)	Total lead load (lb/d)	Dis. lead limit (µg/L)	Dis. lead load (lb/d)
		003		formation test fluids	average DMR average	0	none		0		0
		005		domestic wastewater	DMR average	0	none		0		0
		006		hydrostatic test water	DMR average	0	daily max.	50	0	8.92	0
		007		Misc. Discharges	DMR average	0	none		0		0
		04A		treated sanitary wastewater	DMR average	0	none		0		0
		04B		treated sanitary wastewater	DMR average	0	none		0		0
135858	LAG33A432	001	Walker #9 Facility	dewatering effluent	not avail.		none		0		0
		002		deck drainage	DMR average	6	none		0		0
		003		formation test fluids	not avail.		none		0		0
		005		domestic wastewater	not avail.		none		0		0
		006		hydrostatic test water	not avail.		daily max.	50	0	8.92	0
		007		Misc. Discharges	not avail.		none		0		0
		04A		treated sanitary wastewater	not avail.		none		0		0
		04B		treated sanitary wastewater	not avail.		none		0		0
164858	LAG533156	001	Calcasieu Parish Police Jury - Lorrain Park	treated sanitary wastewater	DMR average	1,050	none		0		0
155068	LAG533402	001	Brandt A National Oilwell Varco LP Co - Lake Arthur Facility	treated sanitary wastewater	design	800	none		0		0
40915	LAG540206	001	Bell City High School	treated sanitary wastewater	DMR 30-day max	12,195	none		0		0
3880	LAG540398	001	Lacassine Elementary High School	treated sanitary wastewater	design	9,200	none		0		0
42185	LAG540446	001	Broussard Middle School	treated sanitary wastewater	DMR average	9,257	none		0		0
43445	LAG750244	001	C&A Holdings LLC	exterior vehicle and equipment wash wastewater	DMR average	1,900	none		0		0
12389	LAR05N014	001	Jefferson Davis Parish Sanitary Landfill Commission	MSGP - stormwater	DMR average	685,000	none		0		0
		002		MSGP - stormwater	DMR average	263,000	none		0		0
		003		MSGP - stormwater	DMR average	260,000	none		0		0
		004		MSGP - stormwater	DMR average	200,000	none		0		0
		005		treated sanitary wastewater	DMR average	250	none		0		0
		006		MSGP - stormwater	DMR average	31,000	none		0		0
155068	LAR05N390		Brandt A National Oilwell Varco LP	MSGP - stormwater	not avail.		none		0		0

AI #	Permit #	Outfall	Facility name	Outfall type	Flow type	Flow (GPD)	Lead limit type	Total lead limit (µg/L)	Total lead load (lb/d)	Dis. lead limit (µg/L)	Dis. lead load (lb/d)
			Co - Lake Arthur Facility								
162772	LAR05P074		Sweet Lake Land & Oil Co C-9 - Bell City East Field	MSGP - stormwater	not avail.		none		0		0
166694	LAR05P223		Welsh Central Facility # 2 - Wagner Oil Co	MSGP - stormwater	not avail.		none		0		0
84155	LAR10B198	001	Lake Charles Cane - Lacassine Mill	wastewaters and stormwater	design	5,000	none		0		0
		002	LLC - Lacassine	stormwater	expected	9,000	none		0		0
		003	Mill	stormwater	expected	9,000	none		0		0
152245	LAR10E296		MBO LLC - Lacassine Oilfield Service	stormwater	estimated	2,300,000	daily max.	275	0 <sup>a</sup>	49.1	0 <sup>a</sup>
152055	LAR10F052	001/003/004	Louisiana Green Fuels LLC - Lacassine Ethanol Plant	washwaters, non-contact cooling, stormwater, Internal 10A/10B	permit max	2,000,000	none		0		0
		002		non-process stormwater	average	45,000	none		0		0
156743	LAU005690		A NEW Rock Co Inc		not avail.		n/a		0		0
1939	LAU009268		Lyons Flying Service Inc		not avail.		n/a		0		0

Note: n/a = not applicable. (This facility is not permitted.)

<sup>a</sup> This TMDL is being developed for critical low-flow conditions (7Q10). Under low-flow conditions, the WLA for all stormwater discharges will be 0.0 lb/d because the flow will be 0.0 mgd. However, existing stormwater permits limits continue to apply to all stormwater discharges.

LPDES permitted discharges without lead effluent limitations have been determined to not be sources of lead. For these dischargers, LDEQ is not providing allocations or permit limits. If at some point in the future, LDEQ determines that any of the discharges may contain lead, wasteload allocations may be provided along with the appropriate permit conditions.

### 3.3 Seasonal Variability

Because ambient monitoring data indicate that there is little variability of trace metals levels throughout the year, LDEQ has not defined a critical season.

### 3.4 Margin of Safety (MOS)

The Clean Water Act requires that TMDLs take into consideration an MOS. The MOS is the portion of the pollutant loading reserved to account for any uncertainty in the data. There are two ways to incorporate the MOS. One is to implicitly incorporate it by using conservative model assumptions to develop allocations. The other is to explicitly specify a portion of the TMDL as the MOS and use the remainder for allocations (USEPA 1991). For this TMDL, an explicit MOS of 20 percent was used. The MOS is 0.166 lb/day.

### 3.5 Load Allocation (LA)

The LA is the portion of the TMDL assigned to natural background loadings, nonpoint sources, urban runoff, and other anthropogenic sources. The LA was calculated (see below) for this TMDL by subtracting the WLA and MOS from the total TMDL. The LA applies strictly to critical, low-flow conditions. LAs were not allocated to separate nonpoint sources because of the lack of available

source characterization data. The LAs include natural background sources. LDEQ also recognizes that stormwater may contribute to the lead impairments for Subsegment 050601, however, LDEQ cannot provide an allocation for stormwater with a TMDL developed for critical, low-flow conditions.

$$\begin{aligned}\sum LAs &= TMDL - \sum WLAs - MOS \\ \sum LAs &= 0.830 - 0 - 0.166 \\ \sum LAs &= 0.664 \text{ lbs/day}\end{aligned}$$

## 4. Monitoring Plan

LDEQ uses funds provided under section 106 of the Clean Water Act and under the authority of the Louisiana Environmental Quality Act to run a program for monitoring the quality of the state's surface waters. The LDEQ Surveillance Section collects surface water samples at various locations using appropriate sampling methods and procedures to ensure the quality of the data collected. The objectives of the surface water monitoring program are to determine the quality of the state's surface waters, develop a long-term database for water quality trend analysis, and monitor the effectiveness of pollution controls. The data obtained through the surface water monitoring program are used to develop the state's biennial *Water Quality Inventory* and the section 303(d) list of impaired waters. That information is also used to establish priorities for LDEQ's nonpoint source program.

LDEQ has implemented a watershed approach to surface water quality monitoring. Through that approach, the entire state is sampled on a 4-year cycle. Long-term trend monitoring sites at various locations on the larger rivers and Lake Pontchartrain are sampled throughout the 4-year cycle. Sampling is conducted monthly to yield approximately 12 samples per site during each year the site is monitored. Sampling sites are where they are considered representative of the waterbody. Within each basin, all monitored subsegments will be sampled over the year or years specified under each cycle period.

Lacassine Bayou was monitored with the Mermentau River Basin in 2006, 2007, 2008, and 2009. Water quality assessments for the 305(b)/303(d) *Integrated Report* will be conducted for each basin following the last year of its monitoring period. Usually 125 waterbody subsegments are monitored each month under the program. Under the monitoring schedule, approximately one-half of the state's waters are newly assessed for section 305(b) and section 303(d) listing purposes for each biennial cycle, with sampling occurring statewide each year. The 4-year cycle follows an initial 5-year rotation that covered all basins in the state according to the TMDL priorities. Monitoring allows LDEQ to determine whether any improvement has occurred in water quality after the TMDLs have been implemented. When LDEQ evaluates monitoring results at the end of each year, it may add waterbodies to or remove them from the section 303(d) list of impaired waterbodies.

## 5. Public Participation

Federal regulations require LDEQ to notify the public and seek comments concerning the TMDLs it prepares. This TMDL was developed under contract to LDEQ, and LDEQ will hold a public review period seeking comments, information, and data from the public and any other interested party. The notice for the public review period will be published in local and state newspapers and on LDEQ's electronic notification system. The TMDL report will be available on LDEQ's TMDL Web site at

[www.deq.louisiana.gov/portal/default.aspx?tabid=1563](http://www.deq.louisiana.gov/portal/default.aspx?tabid=1563). The public review period will last for 30 days. LDEQ will review all comments received, and this TMDL might be revised to reflect comments if appropriate.

## 6. References

- LDEQ (Louisiana Department of Environmental Quality). 1996. *1996 Louisiana Water Quality Inventory: Integrated Report*. Louisiana Department of Environmental Quality, Baton Rouge, LA. <<http://www.deq.louisiana.gov/portal/tabid/2201/Default.aspx>>. Accessed June 21, 2010.
- LDEQ (Louisiana Department of Environmental Quality). 1998. *1998 Louisiana Water Quality Inventory: Integrated Report*. Louisiana Department of Environmental Quality, Baton Rouge, LA. <<http://www.deq.louisiana.gov/portal/tabid/2201/Default.aspx>>. Accessed June 21, 2010.
- LDEQ (Louisiana Department of Environmental Quality). 2000. *Environmental Regulatory Code*, Part IX. Water Quality Regulations. LAC33:IX.1109.A. Louisiana Department of Environmental Quality, Baton Rouge, LA.
- LDEQ (Louisiana Department of Environmental Quality). 2001. *2000 Louisiana Water Quality Inventory: Integrated Report*. Louisiana Department of Environmental Quality, Baton Rouge, LA. <<http://www.deq.louisiana.gov/portal/tabid/2201/Default.aspx>>. Accessed June 22, 2010.
- LDEQ (Louisiana Department of Environmental Quality). 2003. *2002 Louisiana Water Quality Inventory: Integrated Report*. Louisiana Department of Environmental Quality, Baton Rouge, LA. <<http://www.deq.louisiana.gov/portal/tabid/2201/Default.aspx>>. Accessed June 22, 2010.
- LDEQ (Louisiana Department of Environmental Quality). 2004. *Watershed Implementation Plan, Bayou Serpent, Subsegment 030701*. Nonpoint Source Unit. <<http://nonpoint.deq.louisiana.gov/wqa/links/watershedplan/calcasieu/Bayou%20Serpent%20Implementation%20Plan.pdf>>. Accessed April 14, 2010.
- LDEQ (Louisiana Department of Environmental Quality). 2005. *2004 Louisiana Water Quality Inventory: Integrated Report*. Louisiana Department of Environmental Quality, Baton Rouge, LA. <<http://www.deq.louisiana.gov/portal/tabid/2201/Default.aspx>>. Accessed June 22, 2010.
- LDEQ (Louisiana Department of Environmental Quality). 2007a. *2006 Louisiana Water Quality Inventory: Integrated Report*. Louisiana Department of Environmental Quality, Baton Rouge, LA. <<http://www.deq.louisiana.gov/portal/tabid/2201/Default.aspx>>. Accessed June 22, 2010.
- LDEQ (Louisiana Department of Environmental Quality). 2007b. *Environmental Regulatory Code*. Part IX, Water Quality Regulations. Chapter 11. Surface Water Quality Standards. Louisiana Department of Environmental Quality, Baton Rouge, LA. <<http://www.deq.louisiana.gov/portal/Portals/0/planning/regs/title33/33v09.pdf>>. Accessed April 14, 2010.



LDEQ (Louisiana Department of Environmental Quality). 2008. *2008 Final Louisiana Water Quality Inventory: Integrated Report*. Louisiana Department of Environmental Quality, Baton Rouge, LA.

<<http://www.deq.louisiana.gov/portal/LinkClick.aspx?fileticket=I4PibcgdTUA%3d&tabid=2986>>. Accessed June 14, 2010.

LDEQ (Louisiana Department of Environmental Quality). 2009a. *Watershed Implementation Plan For Bayou Nezpique*. Nonpoint Source Unit.

<<http://nonpoint.deq.louisiana.gov/wqa/links/watershedplan/mermentau/Bayou%20Lacassine.pdf>>. Accessed June 22, 2010.

LDEQ (Louisiana Department of Environmental Quality). 2009b. *Environmental Regulatory Code*. Part IX, Water Quality Regulations. Section 1113. Surface Water Quality Standards. Louisiana Department of Environmental Quality, Baton Rouge, LA.

USEPA (U.S. Environmental Protection Agency). 1991. *Guidance for Water Quality-Based Decisions: The TMDL Process*. EPA 440/-4-91-001. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

USEPA (U.S. Environmental Protection Agency). 2007. Multi-Resolution Land Characteristics Consortium (MRLC). 2001 National Land Cover Database (NLCD 2001).

<<http://www.epa.gov/mrlc/nlcd-2001.html>>. Accessed May 5, 2010.

## Appendix A. Hardness, TSS, and Lead Monitoring Data

Table A-1. Hardness and total suspended solids data for station 98

Site	Collection date <sup>a</sup>	Hardness (mg/L)	TSS (mg/L)
Bayou Lacassine near Lake Arthur, Louisiana	3/7/1978	57.4	16
Bayou Lacassine near Lake Arthur, Louisiana	4/11/1978	50.4	120
Bayou Lacassine near Lake Arthur, Louisiana	5/9/1978	55.2	50
Bayou Lacassine near Lake Arthur, Louisiana	6/13/1978	43	42
Bayou Lacassine near Lake Arthur, Louisiana	7/11/1978	42.2	12
Bayou Lacassine near Lake Arthur, Louisiana	8/15/1978	84.8	38
Bayou Lacassine near Lake Arthur, Louisiana	10/10/1978	46	
Bayou Lacassine near Lake Arthur, Louisiana	1/9/1979	53.6	234
Bayou Lacassine near Lake Arthur, Louisiana	05/12/80		290
Bayou Lacassine near Lake Arthur, Louisiana	09/15/80		16
Bayou Lacassine near Lake Arthur, Louisiana	10/13/80		8
Bayou Lacassine near Lake Arthur, Louisiana	12/8/1980	48	48
Bayou Lacassine near Lake Arthur, Louisiana	1/12/1981	46	46
Bayou Lacassine near Lake Arthur, Louisiana	3/9/1981	53	110
Bayou Lacassine near Lake Arthur, Louisiana	4/14/1981	48	266
Bayou Lacassine near Lake Arthur, Louisiana	6/8/1981	47.4	68
Bayou Lacassine near Lake Arthur, Louisiana	7/13/1981	75	138
Bayou Lacassine near Lake Arthur, Louisiana	10/13/1981	57	20
Bayou Lacassine near Lake Arthur, Louisiana	12/14/1981	68	12
Bayou Lacassine near Lake Arthur, Louisiana	2/9/1982	49	26
Bayou Lacassine near Lake Arthur, Louisiana	3/8/1982	46	22
Bayou Lacassine near Lake Arthur, Louisiana	4/13/1982	57	20
Bayou Lacassine near Lake Arthur, Louisiana	5/11/1982	36.6	38
Bayou Lacassine near Lake Arthur, Louisiana	06/15/82		30
Bayou Lacassine near Lake Arthur, Louisiana	7/13/1982	35.2	18
Bayou Lacassine near Lake Arthur, Louisiana	8/10/1982	41.6	11
Bayou Lacassine near Lake Arthur, Louisiana	9/13/1982	36.8	16
Bayou Lacassine near Lake Arthur, Louisiana	10/11/1982	54.8	10
Bayou Lacassine near Lake Arthur, Louisiana	11/16/82		14
Bayou Lacassine near Lake Arthur, Louisiana	12/14/1982	30.6	4
Bayou Lacassine near Lake Arthur, Louisiana	1/10/1983	21	24
Bayou Lacassine near Lake Arthur, Louisiana	2/8/1983	18	46
Bayou Lacassine near Lake Arthur, Louisiana	3/15/1983	29.6	20
Bayou Lacassine near Lake Arthur, Louisiana	4/12/1983	29.2	40
Bayou Lacassine near Lake Arthur, Louisiana	5/10/1983	36.2	34
Bayou Lacassine near Lake Arthur, Louisiana	6/14/1983	36	13
Bayou Lacassine near Lake Arthur, Louisiana	7/12/1983	27.2	14
Bayou Lacassine near Lake Arthur, Louisiana	08/08/83		24
Bayou Lacassine near Lake Arthur, Louisiana	09/12/83		8
Bayou Lacassine near Lake Arthur, Louisiana	10/10/1983	31.8	6
Bayou Lacassine near Lake Arthur, Louisiana	11/14/83		4
Bayou Lacassine near Lake Arthur, Louisiana	12/12/83		46
Bayou Lacassine near Lake Arthur, Louisiana	1/9/1984	39	14

DRAFT—Lacassine Bayou (Subsegment 050601) Dissolved Lead TMDL

Origination Date: August 12, 2010

Site	Collection date <sup>a</sup>	Hardness (mg/L)	TSS (mg/L)
Bayou Lacassine near Lake Arthur, Louisiana	02/13/84		160
Bayou Lacassine near Lake Arthur, Louisiana	03/12/84		40
Bayou Lacassine near Lake Arthur, Louisiana	4/9/1984	55.6	80
Bayou Lacassine near Lake Arthur, Louisiana	05/14/84		20
Bayou Lacassine near Lake Arthur, Louisiana	06/11/84		21
Bayou Lacassine near Lake Arthur, Louisiana	7/9/1984	47	13
Bayou Lacassine near Lake Arthur, Louisiana	9/10/1984	43	23
Bayou Lacassine near Lake Arthur, Louisiana	10/8/1984	47.4	8
Bayou Lacassine near Lake Arthur, Louisiana	11/13/1984	40.2	8
Bayou Lacassine near Lake Arthur, Louisiana	12/10/1984	21	14
Bayou Lacassine near Lake Arthur, Louisiana	1/14/1985	44.4	26
Bayou Lacassine near Lake Arthur, Louisiana	02/12/85		160
Bayou Lacassine near Lake Arthur, Louisiana	3/11/1985	33.4	24
Bayou Lacassine near Lake Arthur, Louisiana	4/8/1985	32.8	52
Bayou Lacassine near Lake Arthur, Louisiana	5/13/1985	60.8	36
Bayou Lacassine near Lake Arthur, Louisiana	6/11/1985	40	28
Bayou Lacassine near Lake Arthur, Louisiana	7/9/1985	41	12
Bayou Lacassine near Lake Arthur, Louisiana	8/12/1985	34	12
Bayou Lacassine near Lake Arthur, Louisiana	9/9/1985	39.2	20
Bayou Lacassine near Lake Arthur, Louisiana	10/15/1985	30	8
Bayou Lacassine near Lake Arthur, Louisiana	11/19/1985	32	10
Bayou Lacassine near Lake Arthur, Louisiana	12/10/1985	30.4	2
Bayou Lacassine near Lake Arthur, Louisiana	2/18/1986	38.4	6
Bayou Lacassine near Lake Arthur, Louisiana	3/17/1986	40.6	26
Bayou Lacassine near Lake Arthur, Louisiana	04/15/86		112
Bayou Lacassine near Lake Arthur, Louisiana	5/13/1986	70.5	32
Bayou Lacassine near Lake Arthur, Louisiana	6/10/1986	56.6	16
Bayou Lacassine near Lake Arthur, Louisiana	7/14/1986	51.3	10
Bayou Lacassine near Lake Arthur, Louisiana	8/11/1986	33.4	12
Bayou Lacassine near Lake Arthur, Louisiana	9/9/1986	47	10
Bayou Lacassine near Lake Arthur, Louisiana	10/13/1986	53.5	6
Bayou Lacassine near Lake Arthur, Louisiana	11/18/1986	38.6	20
Bayou Lacassine near Lake Arthur, Louisiana	12/9/1986	26.6	10
Bayou Lacassine near Lake Arthur, Louisiana	1/13/1987	23.7	56
Bayou Lacassine near Lake Arthur, Louisiana	2/17/1987	33.9	160
Bayou Lacassine near Lake Arthur, Louisiana	3/10/1987	24.2	36
Bayou Lacassine near Lake Arthur, Louisiana	4/14/1987	27.3	68
Bayou Lacassine near Lake Arthur, Louisiana	5/12/1987	73.3	56
Bayou Lacassine near Lake Arthur, Louisiana	6/9/1987	59.9	16
Bayou Lacassine near Lake Arthur, Louisiana	7/13/1987	47	6
Bayou Lacassine near Lake Arthur, Louisiana	8/11/1987	30.5	18
Bayou Lacassine near Lake Arthur, Louisiana	9/15/1987	34.8	14
Bayou Lacassine near Lake Arthur, Louisiana	10/12/1987	40.2	22
Bayou Lacassine near Lake Arthur, Louisiana	11/17/1987	36	34
Bayou Lacassine near Lake Arthur, Louisiana	12/15/1987	25.1	5
Bayou Lacassine near Lake Arthur, Louisiana	1/11/1988	19.8	52

DRAFT—Lacassine Bayou (Subsegment 050601) Dissolved Lead TMDL

Origination Date: August 12, 2010

Site	Collection date <sup>a</sup>	Hardness (mg/L)	TSS (mg/L)
Bayou Lacassine near Lake Arthur, Louisiana	2/8/1988	24.3	56
Bayou Lacassine near Lake Arthur, Louisiana	3/15/1988	18.6	48
Bayou Lacassine near Lake Arthur, Louisiana	4/12/1988	28.8	60
Bayou Lacassine near Lake Arthur, Louisiana	5/10/1988	43.8	47
Bayou Lacassine near Lake Arthur, Louisiana	6/14/1988	35.6	26
Bayou Lacassine near Lake Arthur, Louisiana	7/12/1988	43.6	29
Bayou Lacassine near Lake Arthur, Louisiana	8/8/1988	42.1	9
Bayou Lacassine near Lake Arthur, Louisiana	9/13/1988	26.1	
Bayou Lacassine near Lake Arthur, Louisiana	10/11/1988	33.5	16
Bayou Lacassine near Lake Arthur, Louisiana	11/15/1988	32	22
Bayou Lacassine near Lake Arthur, Louisiana	12/13/1988	47.8	44
Bayou Lacassine near Lake Arthur, Louisiana	1/10/1989	57.6	36
Bayou Lacassine near Lake Arthur, Louisiana	2/13/1989	31.8	32
Bayou Lacassine near Lake Arthur, Louisiana	3/13/1989	50.4	13
Bayou Lacassine near Lake Arthur, Louisiana	4/10/1989	91.7	46
Bayou Lacassine near Lake Arthur, Louisiana	5/9/1989	63.9	22
Bayou Lacassine near Lake Arthur, Louisiana	6/13/1989	34.6	14
Bayou Lacassine near Lake Arthur, Louisiana	7/11/1989	24.9	24
Bayou Lacassine near Lake Arthur, Louisiana	8/15/1989	30.4	15
Bayou Lacassine near Lake Arthur, Louisiana	9/12/1989	32.2	12
Bayou Lacassine near Lake Arthur, Louisiana	10/9/1989	30.5	16
Bayou Lacassine near Lake Arthur, Louisiana	11/14/1989	27.9	22
Bayou Lacassine near Lake Arthur, Louisiana	12/11/1989	30.6	52
Bayou Lacassine near Lake Arthur, Louisiana	1/8/1990	23.7	52
Bayou Lacassine near Lake Arthur, Louisiana	2/12/1990	31.6	34
Bayou Lacassine near Lake Arthur, Louisiana	3/12/1990	22.1	12
Bayou Lacassine near Lake Arthur, Louisiana	4/10/1990	41.2	
Bayou Lacassine near Lake Arthur, Louisiana	5/14/1990	20.6	16
Bayou Lacassine near Lake Arthur, Louisiana	6/12/1990	27.9	12
Bayou Lacassine near Lake Arthur, Louisiana	7/10/1990	43.5	9
Bayou Lacassine near Lake Arthur, Louisiana	8/14/1990	53.1	21
Bayou Lacassine near Lake Arthur, Louisiana	9/11/1990	70	17
Bayou Lacassine near Lake Arthur, Louisiana	10/16/1990	54.3	16
Bayou Lacassine near Lake Arthur, Louisiana	11/14/1990	49.8	15
Bayou Lacassine near Lake Arthur, Louisiana	12/11/1990	31.1	22
Bayou Lacassine near Lake Arthur, Louisiana	1/15/1991	14.9	32
Bayou Lacassine near Lake Arthur, Louisiana	2/5/1991	24.2	34
Bayou Lacassine near Lake Arthur, Louisiana	3/12/1991	7.6	52
Bayou Lacassine near Lake Arthur, Louisiana	4/16/1991	53.7	170
Bayou Lacassine near Lake Arthur, Louisiana	5/14/1991	32.3	20
Bayou Lacassine near Lake Arthur, Louisiana	6/11/1991	34.3	8
Bayou Lacassine near Lake Arthur, Louisiana	7/16/1991	42.6	28
Bayou Lacassine near Lake Arthur, Louisiana	8/13/1991	39.4	14
Bayou Lacassine near Lake Arthur, Louisiana	9/10/1991	1,000	24
Bayou Lacassine near Lake Arthur, Louisiana	10/15/1991	42.8	12
Bayou Lacassine near Lake Arthur, Louisiana	11/19/1991	30.5	42

## DRAFT—Lacassine Bayou (Subsegment 050601) Dissolved Lead TMDL

Origination Date: August 12, 2010

Site	Collection date <sup>a</sup>	Hardness (mg/L)	TSS (mg/L)
Bayou Lacassine near Lake Arthur, Louisiana	12/10/1991	38.3	32
Bayou Lacassine near Lake Arthur, Louisiana	1/7/1992	52.1	18
Bayou Lacassine near Lake Arthur, Louisiana	2/11/1992	20.5	42
Bayou Lacassine near Lake Arthur, Louisiana	3/10/1992	20.1	40
Bayou Lacassine near Lake Arthur, Louisiana	4/7/1992	68.1	84
Bayou Lacassine near Lake Arthur, Louisiana	5/12/1992	1,133	140
Bayou Lacassine near Lake Arthur, Louisiana	6/16/1992	63.5	20
Bayou Lacassine near Lake Arthur, Louisiana	7/14/1992	55.1	215
Bayou Lacassine near Lake Arthur, Louisiana	8/11/1992	37.9	25
Bayou Lacassine near Lake Arthur, Louisiana	9/15/1992	45.9	8
Bayou Lacassine near Lake Arthur, Louisiana	10/13/1992	43	16
Bayou Lacassine near Lake Arthur, Louisiana	11/17/1992	32.4	34
Bayou Lacassine near Lake Arthur, Louisiana	12/15/1992	29.7	33
Bayou Lacassine near Lake Arthur, Louisiana	1/12/1993	20	37
Bayou Lacassine near Lake Arthur, Louisiana	2/9/1993	28.2	24
Bayou Lacassine near Lake Arthur, Louisiana	3/9/1993	25.4	30
Bayou Lacassine near Lake Arthur, Louisiana	4/13/1993	22.5	32
Bayou Lacassine near Lake Arthur, Louisiana	5/11/1993	33	18
Bayou Lacassine near Lake Arthur, Louisiana	6/15/1993	32.7	8
Bayou Lacassine near Lake Arthur, Louisiana	7/13/1993	42.8	12
Bayou Lacassine near Lake Arthur, Louisiana	8/10/1993	43.4	10
Bayou Lacassine near Lake Arthur, Louisiana	9/14/1993	43.8	12
Bayou Lacassine near Lake Arthur, Louisiana	10/12/1993	42	18
Bayou Lacassine near Lake Arthur, Louisiana	11/16/1993	40.8	55
Bayou Lacassine near Lake Arthur, Louisiana	12/14/1993	33.6	24
Bayou Lacassine near Lake Arthur, Louisiana	1/11/1994	38.6	40
Bayou Lacassine near Lake Arthur, Louisiana	2/8/1994	25.6	31
Bayou Lacassine near Lake Arthur, Louisiana	3/15/1994	43.3	48
Bayou Lacassine near Lake Arthur, Louisiana	4/12/1994	54	32
Bayou Lacassine near Lake Arthur, Louisiana	5/10/1994	43.6	16
Bayou Lacassine near Lake Arthur, Louisiana	6/14/1994	45	26
Bayou Lacassine near Lake Arthur, Louisiana	7/12/1994	27.5	25
Bayou Lacassine near Lake Arthur, Louisiana	8/9/1994	38.6	19
Bayou Lacassine near Lake Arthur, Louisiana	9/13/1994	36.1	9
Bayou Lacassine near Lake Arthur, Louisiana	10/11/1994	40	19
Bayou Lacassine near Lake Arthur, Louisiana	11/15/1994	34.4	19
Bayou Lacassine near Lake Arthur, Louisiana	12/13/1994	33.9	12
Bayou Lacassine near Lake Arthur, Louisiana	1/10/1995	39.3	46
Bayou Lacassine near Lake Arthur, Louisiana	2/14/1995	32.5	16
Bayou Lacassine near Lake Arthur, Louisiana	3/14/1995	26.8	60
Bayou Lacassine near Lake Arthur, Louisiana	4/4/1995	3.5	36
Bayou Lacassine near Lake Arthur, Louisiana	5/9/1995	37.1	22
Bayou Lacassine near Lake Arthur, Louisiana	6/13/1995	32.2	9
Bayou Lacassine near Lake Arthur, Louisiana	7/11/1995	36.2	13
Bayou Lacassine near Lake Arthur, Louisiana	8/15/1995	37.9	12
Bayou Lacassine near Lake Arthur, Louisiana	9/12/1995	32	10



## DRAFT—Lacassine Bayou (Subsegment 050601) Dissolved Lead TMDL

Origination Date: August 12, 2010

Site	Collection date <sup>a</sup>	Hardness (mg/L)	TSS (mg/L)
Bayou Lacassine near Lake Arthur, Louisiana	10/10/1995	40.2	32
Bayou Lacassine near Lake Arthur, Louisiana	11/14/1995	32	20
Bayou Lacassine near Lake Arthur, Louisiana	12/12/1995	33.6	16
Bayou Lacassine near Lake Arthur, Louisiana	1/9/1996	16.8	61
Bayou Lacassine near Lake Arthur, Louisiana	2/13/1996	51.9	50
Bayou Lacassine near Lake Arthur, Louisiana	3/12/1996	48.9	52
Bayou Lacassine near Lake Arthur, Louisiana	4/9/1996	112	92
Bayou Lacassine near Lake Arthur, Louisiana	5/14/1996	86.3	4
Bayou Lacassine near Lake Arthur, Louisiana	6/11/1996	78.3	124
Bayou Lacassine near Lake Arthur, Louisiana	7/9/1996	55.4	18
Bayou Lacassine near Lake Arthur, Louisiana	8/13/1996	47.7	16
Bayou Lacassine near Lake Arthur, Louisiana	9/10/1996	36	10
Bayou Lacassine near Lake Arthur, Louisiana	10/15/1996	29.5	7.3
Bayou Lacassine near Lake Arthur, Louisiana	11/19/1996	19.3	66
Bayou Lacassine near Lake Arthur, Louisiana	12/10/1996	27.9	14
Bayou Lacassine near Lake Arthur, Louisiana	1/7/1997	35.9	17
Bayou Lacassine near Lake Arthur, Louisiana	2/18/1997	17.8	66
Bayou Lacassine near Lake Arthur, Louisiana	3/11/1997	27.6	15.3
Bayou Lacassine near Lake Arthur, Louisiana	4/15/1997	39	86
Bayou Lacassine near Lake Arthur, Louisiana	5/13/1997	31.7	6
Bayou Lacassine near Lake Arthur, Louisiana	6/10/1997	42.6	10
Bayou Lacassine near Lake Arthur, Louisiana	7/15/1997	35.4	12
Bayou Lacassine near Lake Arthur, Louisiana	8/12/1997	62.2	14
Bayou Lacassine near Lake Arthur, Louisiana	9/9/1997	48.8	14
Bayou Lacassine near Lake Arthur, Louisiana	10/14/1997	53.5	27.9
Bayou Lacassine near Lake Arthur, Louisiana	11/18/1997	46.2	12
Bayou Lacassine near Lake Arthur, Louisiana	12/9/1997	33.6	18
Bayou Lacassine near Lake Arthur, Louisiana	1/13/1998	16.4	40
Bayou Lacassine near Lake Arthur, Louisiana	2/10/1998	24.8	18
Bayou Lacassine near Lake Arthur, Louisiana	3/10/1998	31	70
Bayou Lacassine near Lake Arthur, Louisiana	4/14/1998	22.7	6
Bayou Lacassine near Lake Arthur, Louisiana	5/12/1998	61.8	9
Bayou Lacassine near Lake Arthur, Louisiana	06/17/98		13
Bayou Lacassine near Lake Arthur, Louisiana	07/08/98		4
Bayou Lacassine near Lake Arthur, Louisiana	08/05/98		13
Bayou Lacassine near Lake Arthur, Louisiana	08/19/98		18
Bayou Lacassine near Lake Arthur, Louisiana	08/26/98		8
Bayou Lacassine near Lake Arthur, Louisiana	09/02/98		13.5
Bayou Lacassine near Lake Arthur, Louisiana	09/16/98		11
Bayou Lacassine near Lake Arthur, Louisiana	10/7/1998	41.2	15
Bayou Lacassine near Lake Arthur, Louisiana	10/21/1998	39.9	2
Bayou Lacassine near Lake Arthur, Louisiana	11/5/1998	39.8	5
Bayou Lacassine near Lake Arthur, Louisiana	11/18/1998	33.8	32
Bayou Lacassine near Lake Arthur, Louisiana	12/2/1998	35.6	9.5
Bayou Lacassine near Lake Arthur, Louisiana	1/13/2003	36.5	80
Bayou Lacassine near Lake Arthur, Louisiana	2/4/2003	38.3	51.4

Site	Collection date <sup>a</sup>	Hardness (mg/L)	TSS (mg/L)
Bayou Lacassine near Lake Arthur, Louisiana	3/11/2003	34.1	110
Bayou Lacassine near Lake Arthur, Louisiana	4/8/2003	68.2	58
Bayou Lacassine near Lake Arthur, Louisiana	5/6/2003	50.4	30
Bayou Lacassine near Lake Arthur, Louisiana	6/3/2003	45.5	11.5
Bayou Lacassine near Lake Arthur, Louisiana	7/8/2003	43.2	13
Bayou Lacassine near Lake Arthur, Louisiana	8/19/2003	37.2	18
Bayou Lacassine near Lake Arthur, Louisiana	9/9/2003	36.2	14.7
Bayou Lacassine near Lake Arthur, Louisiana	10/7/2003	47.7	10.5
Bayou Lacassine near Lake Arthur, Louisiana	11/5/2003	32.9	7.3
Bayou Lacassine near Lake Arthur, Louisiana	12/2/2003	32.8	40
Bayou Lacassine near Lake Arthur, Louisiana	1/16/2007	31	23
Bayou Lacassine near Lake Arthur, Louisiana	2/14/2007	36.9	101
Bayou Lacassine near Lake Arthur, Louisiana	3/13/2007	39	49
Bayou Lacassine near Lake Arthur, Louisiana	4/3/2007	82.7	100
Bayou Lacassine near Lake Arthur, Louisiana	4/24/2007	44.2	40
Bayou Lacassine near Lake Arthur, Louisiana	5/15/2007	59.2	16.5
Bayou Lacassine near Lake Arthur, Louisiana	6/5/2007	41.4	22.5
Bayou Lacassine near Lake Arthur, Louisiana	6/26/2007	58.6	12
Bayou Lacassine near Lake Arthur, Louisiana	7/24/2007	47.9	13.5
Bayou Lacassine near Lake Arthur, Louisiana	8/14/2007	40.8	12
Bayou Lacassine near Lake Arthur, Louisiana	9/12/2007	49.2	12
Bayou Lacassine near Lake Arthur, Louisiana	10/3/2007	41.5	10

a. Data from before 2005 were not included in TMDL analysis.

**Table A-2. Hardness summary statistics**

Statistic	Value
Minimum (mg/L)	31
Maximum (mg/L)	82.7
Average (mg/L)	44.8083
Count	24

a. Data from before 2003 were not included in TMDL analysis.

**Table A-3. Dissolved lead data for station 98**

Site	Collection date	MDL (µg/L)	Type	Result (µg/L) <sup>a</sup>
Bayou Lacassine near Lake Arthur, Louisiana	2/13/79			498
Bayou Lacassine near Lake Arthur, Louisiana	3/13/79			33.1
Bayou Lacassine near Lake Arthur, Louisiana	4/17/79			56.5
Bayou Lacassine near Lake Arthur, Louisiana	5/15/79			83.1
Bayou Lacassine near Lake Arthur, Louisiana	6/12/79			69.1
Bayou Lacassine near Lake Arthur, Louisiana	12/10/79			14.4
Bayou Lacassine near Lake Arthur, Louisiana	1/14/80			48.4
Bayou Lacassine near Lake Arthur, Louisiana	2/11/80			1.5
Bayou Lacassine near Lake Arthur, Louisiana	3/10/80			174.9
Bayou Lacassine near Lake Arthur, Louisiana	8/11/80			120.6
Bayou Lacassine near Lake Arthur, Louisiana	9/15/80			69.2
Bayou Lacassine near Lake Arthur, Louisiana	10/13/80			78.6
Bayou Lacassine near Lake Arthur, Louisiana	12/8/80			17.5
Bayou Lacassine near Lake Arthur, Louisiana	1/12/81			21.8
Bayou Lacassine near Lake Arthur, Louisiana	3/9/81			25.7

DRAFT—Lacassine Bayou (Subsegment 050601) Dissolved Lead TMDL  
 Origination Date: August 12, 2010

Site	Collection date	MDL (µg/L)	Type	Result (µg/L) <sup>a</sup>
Bayou Lacassine near Lake Arthur, Louisiana	4/14/81			22.8
Bayou Lacassine near Lake Arthur, Louisiana	6/8/81			39.1
Bayou Lacassine near Lake Arthur, Louisiana	7/13/81			25
Bayou Lacassine near Lake Arthur, Louisiana	10/13/81			14.8
Bayou Lacassine near Lake Arthur, Louisiana	11/17/81			23.2
Bayou Lacassine near Lake Arthur, Louisiana	12/14/81			16.8
Bayou Lacassine near Lake Arthur, Louisiana	2/9/82			12.8
Bayou Lacassine near Lake Arthur, Louisiana	3/8/82			11.6
Bayou Lacassine near Lake Arthur, Louisiana	5/11/82			10.1
Bayou Lacassine near Lake Arthur, Louisiana	6/15/82			4.9
Bayou Lacassine near Lake Arthur, Louisiana	7/13/82			3.1
Bayou Lacassine near Lake Arthur, Louisiana	8/10/82			8.4
Bayou Lacassine near Lake Arthur, Louisiana	9/13/82			10
Bayou Lacassine near Lake Arthur, Louisiana	3/15/83			25.3
Bayou Lacassine near Lake Arthur, Louisiana	4/12/83			39.2
Bayou Lacassine near Lake Arthur, Louisiana	6/14/83			19.5
Bayou Lacassine near Lake Arthur, Louisiana	7/12/83			21.9
Bayou Lacassine near Lake Arthur, Louisiana	8/8/83			25.3
Bayou Lacassine near Lake Arthur, Louisiana	9/12/83			2.3
Bayou Lacassine near Lake Arthur, Louisiana	11/14/83			3.4
Bayou Lacassine near Lake Arthur, Louisiana	12/12/83			4.2
Bayou Lacassine near Lake Arthur, Louisiana	1/9/84			3.9
Bayou Lacassine near Lake Arthur, Louisiana	4/9/84			27.6
Bayou Lacassine near Lake Arthur, Louisiana	5/14/84			21.3
Bayou Lacassine near Lake Arthur, Louisiana	6/11/84			4.1
Bayou Lacassine near Lake Arthur, Louisiana	7/9/84			1.4
Bayou Lacassine near Lake Arthur, Louisiana	8/13/84			1.6
Bayou Lacassine near Lake Arthur, Louisiana	9/10/84			2.9
Bayou Lacassine near Lake Arthur, Louisiana	10/8/84			0.1
Bayou Lacassine near Lake Arthur, Louisiana	11/13/84			2
Bayou Lacassine near Lake Arthur, Louisiana	12/10/84			7.3
Bayou Lacassine near Lake Arthur, Louisiana	1/14/85			11.5
Bayou Lacassine near Lake Arthur, Louisiana	2/12/85			12.7
Bayou Lacassine near Lake Arthur, Louisiana	3/11/85			6.4
Bayou Lacassine near Lake Arthur, Louisiana	4/8/85			21.7
Bayou Lacassine near Lake Arthur, Louisiana	5/13/85			16.4
Bayou Lacassine near Lake Arthur, Louisiana	6/11/85			8.7
Bayou Lacassine near Lake Arthur, Louisiana	7/9/85			5.8
Bayou Lacassine near Lake Arthur, Louisiana	8/12/85			0.5
Bayou Lacassine near Lake Arthur, Louisiana	9/9/85			35.6
Bayou Lacassine near Lake Arthur, Louisiana	10/15/85			9.7
Bayou Lacassine near Lake Arthur, Louisiana	11/19/85			6.2
Bayou Lacassine near Lake Arthur, Louisiana	12/10/85			1.8
Bayou Lacassine near Lake Arthur, Louisiana	2/18/86			18
Bayou Lacassine near Lake Arthur, Louisiana	3/17/86			10.8
Bayou Lacassine near Lake Arthur, Louisiana	4/15/86			16.2
Bayou Lacassine near Lake Arthur, Louisiana	5/13/86			16.4
Bayou Lacassine near Lake Arthur, Louisiana	7/14/86			1.4
Bayou Lacassine near Lake Arthur, Louisiana	9/9/86			2.2
Bayou Lacassine near Lake Arthur, Louisiana	11/18/86			2.5
Bayou Lacassine near Lake Arthur, Louisiana	1/13/87			8.5
Bayou Lacassine near Lake Arthur, Louisiana	3/10/87			6.9
Bayou Lacassine near Lake Arthur, Louisiana	5/12/87			9
Bayou Lacassine near Lake Arthur, Louisiana	7/13/87			2
Bayou Lacassine near Lake Arthur, Louisiana	9/15/87			1.8

DRAFT—Lacassine Bayou (Subsegment 050601) Dissolved Lead TMDL  
 Origination Date: August 12, 2010

Site	Collection date	MDL (µg/L)	Type	Result (µg/L) <sup>a</sup>
Bayou Lacassine near Lake Arthur, Louisiana	11/17/87			1.7
Bayou Lacassine near Lake Arthur, Louisiana	1/11/88			6.7
Bayou Lacassine near Lake Arthur, Louisiana	3/15/88			5.8
Bayou Lacassine near Lake Arthur, Louisiana	5/10/88			27.4
Bayou Lacassine near Lake Arthur, Louisiana	7/12/88			3.1
Bayou Lacassine near Lake Arthur, Louisiana	9/13/88			1
Bayou Lacassine near Lake Arthur, Louisiana	11/15/88			2.7
Bayou Lacassine near Lake Arthur, Louisiana	1/10/89			3.6
Bayou Lacassine near Lake Arthur, Louisiana	3/13/89			14.9
Bayou Lacassine near Lake Arthur, Louisiana	5/9/89			33.2
Bayou Lacassine near Lake Arthur, Louisiana	7/11/89			0.4
Bayou Lacassine near Lake Arthur, Louisiana	9/12/89			5.5
Bayou Lacassine near Lake Arthur, Louisiana	11/14/89			1.5
Bayou Lacassine near Lake Arthur, Louisiana	1/8/90			6.5
Bayou Lacassine near Lake Arthur, Louisiana	3/12/90			7.3
Bayou Lacassine near Lake Arthur, Louisiana	5/14/90			5.6
Bayou Lacassine near Lake Arthur, Louisiana	7/10/90			6.4
Bayou Lacassine near Lake Arthur, Louisiana	9/11/90			5
Bayou Lacassine near Lake Arthur, Louisiana	11/14/90			3.4
Bayou Lacassine near Lake Arthur, Louisiana	2/5/91		Filtered	0.9
Bayou Lacassine near Lake Arthur, Louisiana	3/12/91		Filtered	2.9
Bayou Lacassine near Lake Arthur, Louisiana	4/16/91		Filtered	0.8
Bayou Lacassine near Lake Arthur, Louisiana	5/14/91		Filtered	1.8
Bayou Lacassine near Lake Arthur, Louisiana	6/11/91		Filtered	0.7
Bayou Lacassine near Lake Arthur, Louisiana	7/16/91		Filtered	1.1
Bayou Lacassine near Lake Arthur, Louisiana	8/13/91		Filtered	1.9
Bayou Lacassine near Lake Arthur, Louisiana	9/10/91		Filtered	1.3
Bayou Lacassine near Lake Arthur, Louisiana	10/15/91		Filtered	0.7
Bayou Lacassine near Lake Arthur, Louisiana	11/19/91		Filtered	1.5
Bayou Lacassine near Lake Arthur, Louisiana	12/10/91		Filtered	1.2
Bayou Lacassine near Lake Arthur, Louisiana	1/7/92		Filtered	1.3
Bayou Lacassine near Lake Arthur, Louisiana	2/11/92		Filtered	2.8
Bayou Lacassine near Lake Arthur, Louisiana	3/10/92		Filtered	0.3
Bayou Lacassine near Lake Arthur, Louisiana	4/7/92		Filtered	3.9
Bayou Lacassine near Lake Arthur, Louisiana	5/12/92		Filtered	1.8
Bayou Lacassine near Lake Arthur, Louisiana	6/16/92		Filtered	1.9
Bayou Lacassine near Lake Arthur, Louisiana	7/14/92		Filtered	0.3
Bayou Lacassine near Lake Arthur, Louisiana	8/11/92		Filtered	0.3
Bayou Lacassine near Lake Arthur, Louisiana	9/15/92		Filtered	2.7
Bayou Lacassine near Lake Arthur, Louisiana	10/13/92		Filtered	1.6
Bayou Lacassine near Lake Arthur, Louisiana	11/17/92		Filtered	1.6
Bayou Lacassine near Lake Arthur, Louisiana	12/15/92		Filtered	1.1
Bayou Lacassine near Lake Arthur, Louisiana	1/12/93		Filtered	2.2
Bayou Lacassine near Lake Arthur, Louisiana	2/9/93		Filtered	3.3
Bayou Lacassine near Lake Arthur, Louisiana	3/9/93		Filtered	0.7
Bayou Lacassine near Lake Arthur, Louisiana	4/13/93		Filtered	3.7
Bayou Lacassine near Lake Arthur, Louisiana	6/15/93		Filtered	3
Bayou Lacassine near Lake Arthur, Louisiana	7/13/93		Filtered	1.5
Bayou Lacassine near Lake Arthur, Louisiana	8/10/93		Filtered	5.2
Bayou Lacassine near Lake Arthur, Louisiana	9/14/93		Filtered	1
Bayou Lacassine near Lake Arthur, Louisiana	10/12/93		Filtered	0.3
Bayou Lacassine near Lake Arthur, Louisiana	11/16/93		Filtered	0.7
Bayou Lacassine near Lake Arthur, Louisiana	12/14/93		Filtered	1
Bayou Lacassine near Lake Arthur, Louisiana	1/11/94		Filtered	2.4
Bayou Lacassine near Lake Arthur, Louisiana	2/8/94		Filtered	1

DRAFT—Lacassine Bayou (Subsegment 050601) Dissolved Lead TMDL  
 Origination Date: August 12, 2010

Site	Collection date	MDL (µg/L)	Type	Result (µg/L) <sup>a</sup>
Bayou Lacassine near Lake Arthur, Louisiana	3/15/94		Filtered	1.1
Bayou Lacassine near Lake Arthur, Louisiana	4/12/94		Filtered	5.7
Bayou Lacassine near Lake Arthur, Louisiana	5/10/94		Filtered	2.9
Bayou Lacassine near Lake Arthur, Louisiana	6/14/94		Filtered	1
Bayou Lacassine near Lake Arthur, Louisiana	7/12/94		Filtered	2.2
Bayou Lacassine near Lake Arthur, Louisiana	8/9/94		Filtered	3.8
Bayou Lacassine near Lake Arthur, Louisiana	9/13/94		Filtered	1.3
Bayou Lacassine near Lake Arthur, Louisiana	10/11/94		Filtered	1.6
Bayou Lacassine near Lake Arthur, Louisiana	11/15/94		Filtered	0.9
Bayou Lacassine near Lake Arthur, Louisiana	12/13/94		Filtered	0.8
Bayou Lacassine near Lake Arthur, Louisiana	1/10/95		Filtered	1.3
Bayou Lacassine near Lake Arthur, Louisiana	2/14/95		Filtered	2.2
Bayou Lacassine near Lake Arthur, Louisiana	3/14/95		Filtered	1.6
Bayou Lacassine near Lake Arthur, Louisiana	4/4/95		Filtered	0.2
Bayou Lacassine near Lake Arthur, Louisiana	6/13/95		Filtered	1.4
Bayou Lacassine near Lake Arthur, Louisiana	7/11/95		Filtered	0.2
Bayou Lacassine near Lake Arthur, Louisiana	8/15/95		Filtered	0.2
Bayou Lacassine near Lake Arthur, Louisiana	9/12/95		Filtered	0.7
Bayou Lacassine near Lake Arthur, Louisiana	10/10/95		Filtered	0.4
Bayou Lacassine near Lake Arthur, Louisiana	11/14/95		Filtered	1.2
Bayou Lacassine near Lake Arthur, Louisiana	12/12/95		Filtered	1.2
Bayou Lacassine near Lake Arthur, Louisiana	1/9/96		Filtered	2.9
Bayou Lacassine near Lake Arthur, Louisiana	2/13/96		Filtered	1.5
Bayou Lacassine near Lake Arthur, Louisiana	3/12/96		Filtered	0.9
Bayou Lacassine near Lake Arthur, Louisiana	4/9/96		Filtered	0.8
Bayou Lacassine near Lake Arthur, Louisiana	5/14/96		Filtered	1.5
Bayou Lacassine near Lake Arthur, Louisiana	6/11/96		Filtered	1.1
Bayou Lacassine near Lake Arthur, Louisiana	7/9/96		Filtered	0.5
Bayou Lacassine near Lake Arthur, Louisiana	8/13/96		Filtered	0.2
Bayou Lacassine near Lake Arthur, Louisiana	9/10/96		Filtered	0.8
Bayou Lacassine near Lake Arthur, Louisiana	10/15/96		Filtered	0.4
Bayou Lacassine near Lake Arthur, Louisiana	11/19/96		Filtered	0.6
Bayou Lacassine near Lake Arthur, Louisiana	12/10/96		Filtered	0.2
Bayou Lacassine near Lake Arthur, Louisiana	1/7/97		Filtered	2
Bayou Lacassine near Lake Arthur, Louisiana	2/18/97		Filtered	2
Bayou Lacassine near Lake Arthur, Louisiana	3/11/97		Filtered	2
Bayou Lacassine near Lake Arthur, Louisiana	4/15/97		Filtered	2.21
Bayou Lacassine near Lake Arthur, Louisiana	5/13/97		Filtered	2.5
Bayou Lacassine near Lake Arthur, Louisiana	6/10/97		Filtered	2.5
Bayou Lacassine near Lake Arthur, Louisiana	7/15/97		Filtered	2.5
Bayou Lacassine near Lake Arthur, Louisiana	8/12/97		Filtered	2.5
Bayou Lacassine near Lake Arthur, Louisiana	9/9/97		Filtered	2.5
Bayou Lacassine near Lake Arthur, Louisiana	10/14/97		Filtered	2.5
Bayou Lacassine near Lake Arthur, Louisiana	11/18/97		Filtered	2.5
Bayou Lacassine near Lake Arthur, Louisiana	12/9/97		Filtered	5
Bayou Lacassine near Lake Arthur, Louisiana	1/13/98		Filtered	5
Bayou Lacassine near Lake Arthur, Louisiana	2/10/98		Filtered	5
Bayou Lacassine near Lake Arthur, Louisiana	3/10/98		Filtered	5
Bayou Lacassine near Lake Arthur, Louisiana	4/14/98		Filtered	5
Bayou Lacassine near Lake Arthur, Louisiana	5/12/98		Filtered	5
Bayou Lacassine near Lake Arthur, Louisiana	6/17/98		Filtered	5
Bayou Lacassine near Lake Arthur, Louisiana	8/19/98		Filtered	5
Bayou Lacassine near Lake Arthur, Louisiana	8/26/98		Filtered	5
Bayou Lacassine near Lake Arthur, Louisiana	9/16/98		Filtered	5
Bayou Lacassine near Lake Arthur, Louisiana	10/21/98		Filtered	5



Site	Collection date	MDL (µg/L)	Type	Result (µg/L) <sup>a</sup>
Bayou Lacassine near Lake Arthur, Louisiana	11/18/98		Filtered	<b>5</b>
Bayou Lacassine near Lake Arthur, Louisiana	1/13/03	0.01	Filtered	0.61
Bayou Lacassine near Lake Arthur, Louisiana	4/8/03	0.01	Filtered	0.72
Bayou Lacassine near Lake Arthur, Louisiana	7/8/03	0.01	Filtered	0.71
Bayou Lacassine near Lake Arthur, Louisiana	12/23/03	0.01	Filtered	0.45
Bayou Lacassine near Lake Arthur, Louisiana	1/16/07	0.2	Filtered	<b>1.14</b>
Bayou Lacassine near Lake Arthur, Louisiana	4/3/07	0.04	Filtered	0.76
Bayou Lacassine near Lake Arthur, Louisiana	6/5/07		Filtered	<b>1.93</b>
Bayou Lacassine near Lake Arthur, Louisiana	8/14/07		Filtered	0.48

Notes: MDL = method detection limit

a. Exceedances of the calculated standard are bold. Data from before 2003 were not included in TMDL analysis.

**Table A-4. Dissolved lead summary statistics**

Statistic	Value <sup>a</sup>
Minimum (µg/L)	0.45
Maximum (µg/L)	1.93
Average (µg/L)	0.85
Count	8
Percentage of data that violate the standard	25

a. Data from before 2003 were not included in TMDL analysis.